



Alaska BEACH Program Beach Monitoring Handbook

Generic Version

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Beach-Monitoring Handbook

This handbook introduces the DEC Beach Monitoring Program and is designed to be used by any community implementing beach pathogen monitoring. The goal of the program is to reduce or eliminate illness and disease due to contact with water at recreational-use beaches that are contaminated by human and animal waste (fecal pollution).

This handbook was designed to provide you with simple instructions for beach assessments, water-quality sampling, and public notification in the event recreational water becomes contaminated with fecal pollution. The book is divided into four main sections.

Section 1 provides background information about the Alaska Beach Program, disease-causing organisms (Pathogens) and their indicators, and state and federal water-quality standards.

Section 2 gives you information about how to assess the risk of exposure to fecal contamination at beaches in your area. This section includes detailed information about how to collect, handle, and ship water samples for laboratory bacterial analysis, as well as how to conduct a beach survey.

Section 3 tells you whom you should notify when your beach assessment indicates marine water quality is unsafe for water-contact activities. It also provides information about how best to notify the public about the water quality at your beach(es).

Section 4 provides water sampling protocols and example field forms, press releases and signage.

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Section 1 - Background

Nationwide the greatest cause of coastal water quality impairment is bacteria.¹

Beaches are a valuable recreational resource in Alaska. They provide access to coastal recreation waters for swimming, surfing, fishing, playing, and many other water-contact activities. Alaskans do not limit their recreational activities to sandy beaches; gravelly, rocky, or mud-covered beaches are commonly used for recreation. What Alaskans may not know is that recreational activities involving water contact could make them sick if the water is contaminated with human or animal waste (e.g., sewage or other sources of fecal pollution).

A wide variety of sources can contribute to the presence of pathogens (bacteria) associated with fecal pollution in coastal areas. While some of the sources may be direct of “point” sources (e.g., discharge from a wastewater treatment plant), others may be “nonpoint” sources which are much harder to track (e.g., failing septic systems).

As rain washes over a watershed, it can gather pathogens from several different sources, making the process of ruling out whether it is human related or not difficult. In many cases, birds, wildlife, and pets or livestock have been linked to being the sources of high levels of fecal bacteria.

People may get sick from recreating in water near possible fecal pollution sources, such as:

- sewage lagoons
- honey-bucket dumps
- sewage treatment plants
- septic tanks and leach fields
- small boats
- stormwater runoff
- landfills
- wildlife

Water contaminated with fecal pollution may contain disease-causing microbes (pathogenic bacteria, viruses, and protozoa). If people are directly exposed to or ingest this pollution, it can cause stomach aches, diarrhea, or ear, eye, and skin infections. Water-quality monitoring at beaches near fecal-pollution sources can reveal conditions that indicate an elevated risk of becoming ill from water contact.

National BEACH Monitoring Program

The U.S. Environmental Protection Agency (EPA) developed the concept of a Beach Sanitary Survey as a means for providing State and local beach managers with a technologically sound and consistent approach to identify pollution sources and share information.² The survey tool provides a method for documenting historic as well as current records of beach and watershed water quality. It provides baseline information including land use, water quality, and pollutant source data.

¹ US EPA. 2002. National Water Quality Inventory 2000 Report. EPA-841-R-02-001. Washington DC: Environmental Protection Agency.

² US EPA. 2008. Great Lakes Beach Sanitary Survey User Manual. EPA-823-B-06-001 Washington DC. Environmental Protection Agency.

The survey document is meant to serve as a living record that is regularly updated and evaluated. The survey can be broken into two formats; routine and annual sanitary surveys, for temporal data to be evaluated in a more organized manner.

The Beach Sanitary Survey information is used by the Alaska Department of Environmental Conservation (DEC) to prioritize beaches for monitoring and assist in development of models to predict daily bathing beach water quality, if appropriate. The survey also provides support for enforcement actions as it establishes a record of conditions and changes over time. The Beach Sanitary Survey assists beach managers meet the requirements of the BEACH Act Grant Program, as described in the National Beach Guidance and Required Performance Criteria for Grants (USEPA 2002b). For more information about the Beach Sanitary Survey visit <https://www.epa.gov/beach-tech/sanitary-surveys-recreational-waters>

Alaska BEACH Program

In response to the increasing incidence of water-borne illness at public beaches, the U.S. congress passed the Beaches Environmental Assessment and Coastal Health (BEACH) Act of 2000. The Act provides support for state programs to reduce the risk to beach users from contact with fecal contaminated water.

The Act authorized the EPA to award grants to states, and the DEC Division of Water (DOW) has used these grants to create an Alaska BEACH Program.

To date, the Alaska BEACH Program has:

- Defined many of the unique aspects of Alaskan recreational beach use;
- Sent surveys to Alaskan coastal communities to assess the likelihood of fecal pollution at their beaches;
- Used the survey data to rank beaches according to their potential exposure risk;
- Developed a generic beach-monitoring plan;
- Developed a generic risk-communication plan; and
- Conducted pilot water-quality sampling at some Alaskan beaches the community surveys identified as having risks of fecal pollution.

The DEC encourages communities to create local beach-monitoring programs and work with the beach steward(s)³ in notifying the public if there is an elevated risk of becoming ill from the water. Local management of water-sampling, public outreach and education programs, and public-notification programs should provide an effective means of protecting the community from exposure to disease-causing organisms in human and animal waste.

Disease-causing organisms come from a variety of sources and can be complicated to track and monitor. As a result of this, the DEC has developed a BEACH Sanitary Survey, based on EPA's survey tool, to assign

³ Stewards may include local landowners, local government entities, resource managers, non-governmental organizations, etc.

levels of risk in coastal areas where recreational activity takes place, to aid in the identification and remediation of pollution sources, and to protect marine water quality on Alaska's beaches. Use of surveys is just one part of a larger effort to protect water quality through appropriate and relevant management activities. The BEACH Monitoring process includes⁴, and is not necessarily limited to:

- An initial risk assessment of the coastal area of concern;
- Development or improvement of a water quality monitoring plan specific to a particular area;
- A notification plan to communicate levels of risk to the public;
- Conducting a sanitary survey on a routine basis;
- Means for measuring and monitoring results;
- Cooperation amongst landowners and resource managers to resolve or mitigate issues;
- Metrics to measure improvements over time; and
- Increase public awareness and cooperation in controlling water pollution.

Grant Specific BEACH Information

Every BEACH grant program requires the development of a formal relationship with the landowner of the beach being proposed for monitoring. The (Grantee) and the (Municipal Partner/Landowner) agree with the DEC to develop a local beach monitoring program, with the goal of protecting beach users from exposure to water contaminated by fecal pollution.

The (Grantee) BEACH Monitoring Program receives support from the DEC in the form of training, limited funding for water-quality sampling, Standard Operating Procedures for sampling, a Quality Assurance Project Plan template, and a database template for data storage and sharing.

The (Grantee) BEACH Monitoring Program will consist of local individuals periodically conducting beach assessments and collecting water-quality samples for laboratory analysis. Their work will be coordinated by the (Community Name) BEACH Monitor who will keep in touch with the DEC BEACH Project Manager to keep her informed about sampling events.

The roles and responsibilities of the (Community Name) BEACH Monitor and DEC BEACH Project Manager are described in this section. Details about conducting sanitary surveys, collecting and shipping samples, and notifying the public about sample results are given in **Section 2** (Community Beach Assessments) and **Section 3** (Notifying the Public) of this handbook. Figure 1 shows a flow chart describing roles in project organizational structure. In many cases, it is likely that one person may fill more than one role.

⁴ The Alaska Beach Program follows requirements set out in the 2014 National Beach Guidance and Required Performance Criteria for Grants.

(Community Name) BEACH Monitor Responsibilities

The main roles and responsibilities of the (Community Name) BEACH Monitor are to:

- Conduct beach assessments;
- Collect water-quality samples;
- Ship samples to a laboratory for bacterial analysis; and
- Notify the DEC and respective landowner if water samples exceed acceptable bacteria limits.

The (Community Name) BEACH Monitor data analysis responsibilities include:

- Sending beach-sampling and sample identification information to the DEC BEACH Project Manager and DEC Quality Assurance Officer;
- Reviewing laboratory data results to ensure required Quality Assurance/Quality Control (QA/QC) criteria have been met;
- If QA/QC criteria have not been met, the (Community Name) BEACH Monitor will notify the DEC project manager as soon as possible, and in consultation with DEC and other affected parties, develop a corrective action plan to resolve the problem(s);
- Comparing the laboratory results to Alaska and EPA water-quality standards;
- Conferring with the DEC BEACH Program Manager regarding water-quality standard exceedances and the possible need for re-sampling; and
- Submitting laboratory data to DEC, after completing QA/QC protocols, using DEC provided template or DEC approved format.

DEC BEACH Project Manager Responsibilities

The roles and responsibilities of the DEC BEACH Project Manager are to:

- Provide recommendations to (Community Name) for BEACH survey activities;
- Provide recommendations to (Community Name) for water-quality monitoring;
- Provide template for data entry;
- Assist with water-quality data assessment;
- Work with the landowner to notify the public of an exceedance following re-sampling and data assessment, and;
- Report beach-assessment and sampling data to the EPA.

The DEC BEACH Project Manager is also responsible for keeping a record of activities associated with sampling events. This record will include information on the dates, locations, samplers, and results of

the monitoring, and will be used to compile an annual report to the EPA on recreational beach water quality for Alaska.

Most important, the DEC BEACH Project Manager will have lead responsibility in working with the municipality or responsible landowner to develop a public notice and other press-related information advising the public of the risks from marine water when beach sampling results exceed State or federal Water Quality Standards.

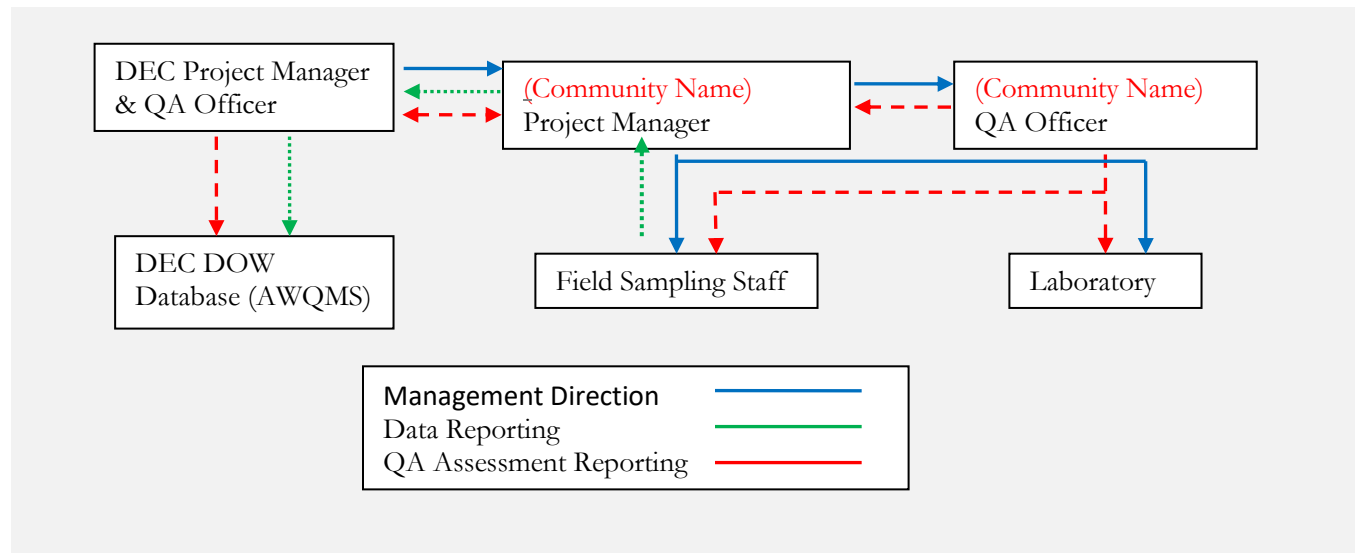


Figure 1: Project Organizational Structure

Water Quality Standards (WQS)

The BEACH program's objective is to monitor for fecal contamination. Bacteria can indicate the presence of fecal contamination, which itself may harbor disease-causing (pathogenic) microbes. The indicator bacteria most commonly used are called coliforms and enterococci. Federal and State Water Quality Standards (WQS) set limits for these parameters. Laboratory testing for the presence and abundance of these bacteria is required.

EPA's Water Quality Standards

The EPA recommends the use of enterococcus bacteria, or enterococci (pronounced ěn'tə-rō-kōk'sī') as indicators of fecal pollution in marine water. Enterococcus bacteria are found in the human intestine and warm-blooded animals. They are subgroup of the fecal streptococci. Studies indicate that the enterococci portion of the streptococcus group is the most efficient bacterial indicator of fresh and marine water quality.

Alaska's single sample criteria is equal to the EPA's 2012 Recommended Recreational Water Quality Criteria's Statistical Threshold Value of 130 CFU/100 mL for enterococci^{5, 6}. The 130 CFU/100 ml value corresponds to the 90th percentile of the water quality distribution associated with the same level of public health protection (in this case, 36 per 1000 recreators'). This criterion is equivalent to Alaska's EPA approved water quality standards for marine pathogens, primary contact criteria (18 AAC 70, see Table 1).

Alaska's Water Quality Standards

The State of Alaska's water quality standard uses enterococci and fecal coliform bacteria as indicators of fecal pollution in marine water for recreational use. The standard for enterococci and fecal coliform bacteria is provided in the Alaska Administrative Code 18 AAC 70 for marine water contact recreation.

Enterococci and fecal coliform bacteria must be determined by the membrane filter technique or Most Probable Number procedure as detailed in Standard Methods for the Examination of Water and Wastewater (American Public Health Association), or by other methods approved by the DEC and EPA.

The Alaska BEACH Program will monitor bacteria against WQS set for Marine Water Recreation- contact recreation (Table 1; 18 AAC 70 amended March 5, 2020). For the EPA WQS, the DEC has determined that Alaska's beaches are generally in the "lightly used" category; therefore, the DEC has adopted the single-sample standard of 130 enterococci per 100 mL for the BEACH program. In addition, the geometric mean of five samples collected within a 30-day period may not exceed 35 enterococci per 100 mL. The single sample standard for fecal coliform is set for Harvesting for Consumption of Raw Mollusks and Other Raw Aquatic Life and may not exceed 31 CFU per 100 mL for a membrane filtration test.

⁵ U.S. EPA. 2014. National Beach Guidance and Required Performance Criteria for Grants, 2014 Edition. EPA-823-B-14-001. Environmental Protection Agency. Washington, D.C.

⁶ U.S. EPA. 2012. Recreational Water Quality Criteria. 820-F-12-058. Office of Water. Environmental Protection Agency. Washington, D.C.

Designated Use	Description of Criteria
(14) Bacteria, For Marine Water Uses	
(B) Water Recreation	
Contact Recreation	In a 30-day period, the geometric mean of samples may not exceed 35 enterococci CFU / 100 mL, and not more than 10% of the samples may exceed a statistical threshold value (STV) of 130 enterococci CFU / 100 mL.
Secondary Contact Recreation	In a 30-day period, the geometric mean of samples may not exceed 200 fecal coliform/100 mL, and not more than 10% of the samples may exceed 400 fecal coliform / 100 mL.
(D) Harvesting for Consumption of Raw Mollusks or Other Raw Aquatic Life	<p>The geometric mean of samples may not exceed 14 fecal coliform / 100 mL; and not more than 10% of the samples may exceed.</p> <ul style="list-style-type: none"> • 42 MPN per 100 ml for a five-tube decimal dilution test; • 49 MPN per 100 ml for a three-tube decimal dilution test; • 28 MPN per 100 ml for a twelve-tube single dilution test; • 31 CFU per 100 ml for a membrane filtration test (see note 14)

Table 1: Alaska Marine Water-Quality Indicator Standards (18 AAC 70)⁷

⁷ Amended March 5, 2020. Find most recent version on ADEC's Water Quality Standards page:
<https://dec.alaska.gov/water/water-quality/standards/>

Section 2 – Community Beach Assessments

Overview

A Sanitary Survey is a type of beach assessment used to identify sources of pollution. It can be an effective tool for protecting human health at recreational-use beaches by providing information that can be used to design future or modify existing monitoring programs. The (Community Name) BEACH Monitor should conduct surveys in suspected high-risk areas to confirm the presence or absence of fecal pollution. An Annual Survey should be conducted on all newly nominated beaches as well as the beginning of each season of on-going monitoring projects to document seasonal changes or new sources. Routine Surveys will be completed when a sample is collected for water-quality testing. Routine surveys are completed using the BEACH Survey Field Form provided in Section 4.

Annual BEACH Surveys collect information from area maps and land use plans, annual and seasonal trends, coastal geomorphic information, and additional potential sources of pollution at a watershed or sub-watershed level. In some cases, Annual BEACH Surveys may be conducted at the end of a sampling season to determine whether changes to the monitoring program should take place in the following year. Information that should be considered during the survey process include:

- Freshwater inputs (river mouth, stream, storm drains);
- Properties with subsurface wastewater disposal systems;
- Significant wildlife habitat/wetlands;
- Agricultural operations;
- Impervious surfaces;
- Marinas/moorages/anchorages;
- Recreational areas and the availability of facilities (restrooms, trash cans, doggie bag disposal stations).

A Routine BEACH survey is conducted by visiting a beach of concern to answer questions and fill in blanks on the BEACH Survey Field Form. Since fecal coliform bacteria may originate from sources other than humans, the assessment will note the number of birds, dogs, or other animals on the beach. Debris, vegetation, tide stage and murky water are also noteworthy. If animal waste sources are identified, (Community Name) Project Managers should discuss their observations with the DEC BEACH Project Manager as soon as possible. The survey may include collecting a water quality sample if the DEC BEACH Project Manager and (Community Name) Project Manager decide that beach users may be exposed to fecal pollution.

Beach Survey Field Form

The BEACH Survey Field Form is a data sheet used for collecting field information as part of the Routine and Annual BEACH survey process. It is designed to gather information that the (Community Name) BEACH Monitor and the DEC BEACH Project Manager can use to make annual and routine comparisons

of physical characteristics. It documents the physical conditions present during sampling events. These forms will be created and managed in a manner that will facilitate easy data entry into the Ambient Water Quality Monitoring System (AWQMS).

The BEACH Survey Field Form is made up of three parts:

1. The first part asks for a description of the beach including its location and the name of the person performing the assessment.
2. The second part asks for details about the water quality sample, if collected. These details include date, time sample number(s), and water temperature. The water temperature is determined by using a calibrated thermometer that reads to 0.1 degree centigrade (0.1°C). Record the temperature to 0.1°C. It is very important to allow time for the thermometer to stabilize before writing down the temperature reading.
3. The third part asks for information about the condition of the beach at the time of the assessment including the weather, levels of activity, and potential pollution sources.

The remainder of the form may ask for additional environmental parameters, including pH, conductivity, total dissolved solids, turbidity, and wave height. These parameters are collected with a handheld probe, turbidimeter, and wave height stick. See section 4 for more information on these devices.

To complete a BEACH survey, field staff must fill out all of the information on the Beach Survey Field Form including a sketch map of the sampling location. An example Beach Survey Field Form is in Section 4.

Beach Survey Schedule and Locations

The (Community Name) BEACH Monitor should conduct BEACH surveys using the BEACH Survey Field Form at designated locations at the beginning of the sampling season and each time a water sample is collected for water quality testing. These observations can help the (Community Name) BEACH Monitor and the DEC BEACH Project Manager assess changes from year to year and modify the existing monitoring program by identifying times during the season with the highest risk of people getting sick from water contact.

The (Community Name) BEACH Monitor may also conduct BEACH surveys at other suspected high-risk beaches to identify any persistent problems that may warrant a need for water quality testing. The information gathered can be used by the (Community Name) BEACH Monitor and the DEC BEACH Project Manager to design future monitoring programs to protect human health during the recreation season. Additional sampling must be discussed and approved by the DEC BEACH Project Manager before water samples are collected.

Sampling location data should be collected using a calibrated GPS unit to ensure accuracy. All latitude/longitude data should be collected and recorded in decimal form (12.3456) using the Horizontal Collection System datum NAD83. All future sampling events should take place within 100 feet of that site unless the DEC BEACH Project Manager and (Community Name) BEACH Monitor determine that the site does not accurately represent background conditions of beach water quality.

Samples must be sent to a laboratory that is approved by DEC for Fecal Coliform Bacteria (Method 9222D) and Enterococci by MPN (Method ASTM D-6503-99). A list of approved laboratories is attached at the end of this handbook (Appendix A). This list is updated periodically by DEC staff and can be found by visiting the DEC website (<http://dec.alaska.gov/applications/eh/EHLabStatus/MicroReport/Index>).

Sample Chain of Custody

The sample chain of custody form documents actions taken to ensure that samples are traceable from the time they are collected at the beach to the time the analytical laboratory reports the results. The laboratory usually supplies these forms with their field sampling kit. Generally, a completed chain-of-custody form will identify the samples, request analysis from the laboratory, note any special instructions, and document who handled the samples from the time they were shipped from the field to the time they reach the laboratory. The (Community Name) BEACH Monitor is responsible for filling out the chain-of-custody form and keeping a copy for reference. The form must include the following information:

- Name and contact information of the person taking the samples;
- Sample identification, including the sample number, and date and time the sample was collected;
- The sample preservation method(s);
- The type of sample (e.g., water sample, sample replicates, field and temperature blanks) and the number of jars being submitted for analysis;
- The requested analysis (enterococcus and fecal coliform bacteria);
- The requested turn-around time (Note: the laboratory is requested to analyze the samples and present the results within 36 hours of sampling);
- Name and contact information for delivery of results (Note: the results should be sent to the DEC BEACH Project Manager and the (Community Name) BEACH Monitor; and
- A relinquishment signature including printed name, date, and time.

In addition to completing the chain-of-custody form the (Community Name) BEACH Monitor needs to:

4. Put the completed chain-of-custody form into a plastic bag taped to the inside lid of the cooler;
5. Attach two completed chain-of-custody seals (stickers) to cross over the cooler lid seams;
6. Attach a clearly marked label with laboratory contact information on the top of the sample cooler;
7. Hand deliver the samples to the laboratory or airlines;

8. Keep a copy of the airlines' transportation documentation or other means of delivery for reference;
9. Contact the courier service to ensure pick-up and delivery of sample;
10. Contact the laboratory, again, to verify that someone will be there when the samples arrive; and
11. Fax or email a copy of the BEACH Survey Field Form to the DEC BEACH Project Manager.

Laboratory Responsibilities

The (Community Name) BEACH Monitor will work with the pre-determined laboratory to complete analysis of samples and data submission. Laboratories are responsible to comply with the data quality objectives specified in the QAPP and as specified in the laboratory QAP and method specific Standard Operating Procedures (SOPs). Validated sample laboratory data results are reported to the (Community Name) BEACH Monitor and DEC BEACH Project Manager. Electronic project data will be stored on a secure computer, secured cloud network or on a removable hard drive that can be secured. All records will be retained by the contract laboratory for five years.

Preliminary Quality Assurance/Quality Control (QA/QC) Review of Beach Sample Data

When the (Community Name) BEACH Monitor receives sample results from the laboratory, the results need to be compared to the marine Water Quality Standards that are referenced in Section 1 of this handbook. The (Community Name) BEACH Monitor should check to make sure the sample was analyzed within the 6-hour holding time⁸ and that the temperature was within the allowed range when the samples were received at the laboratory.

Secondary reviewers (sampling coordinator/supervisor/project supervisor) are responsible for the review, verification, and validation per the project QAPP of field and laboratory data and data reformatting as appropriate for reporting to DEC Project Manager. The secondary reviewer is also responsible for reporting validated data to the DEC Project Manager.

The data management task will include keeping accurate records of field and laboratory QA/QC samples so that project managers and technical staff who use the data will have appropriate documentation to show that the required minimum data quality standards have been met. The DEC Project Manager will provide a sample data submission template to (Grantee). The DEC DOW Project Manager, DEC QA Officer and AWQMS data entry staff conduct final data reviews (tertiary review) and submits the validated data to AWQMS. See the flow chart in Figure 2 for detailed information on data management responsibilities.

⁸ Total sample holding time for Fecal coliform and enterococci is 8 hours: 6 hours in-field and 2 hours for lab processing.

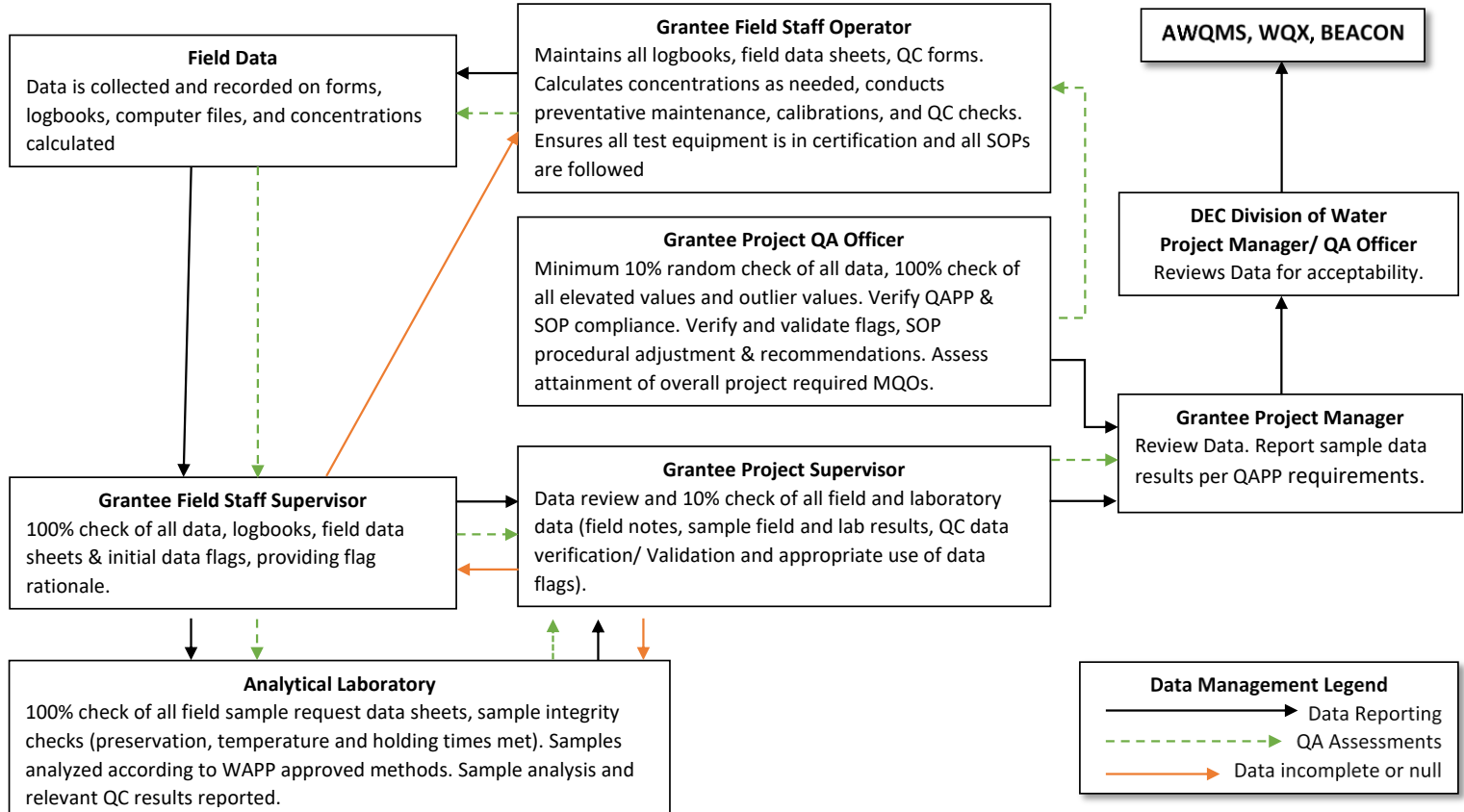


Figure 2: Data Management Flow Chart

Communicating with DEC

After collecting and shipping samples to the laboratory, the (Community Name) BEACH Monitor will let the DEC BEACH Project Manager know that the samples are on their way to the lab and send the completed BEACH Survey Field Form.

After reviewing the sampling results from the laboratory, the (Community Name) BEACH Monitor will need to talk to the DEC BEACH Project Manager to decide if additional sampling or public notification procedures should be initiated.

Re-Sampling

If a sample, after undergoing quality assurance review, is found to exceed BEACH program Water Quality Standards (WQS; Table 1), the (Community Name) BEACH Monitor may be asked by DEC to initiate an additional sampling event to confirm that the exceedance is an on-going issue (See Figure 3). Re-sample protocols will be consistent with those of routine events. If the re-sample event determines that the exceedance is on-going, a Beach Advisory (see Section 3) will be issued by the landowner and DEC. Routine sampling events will continue according to schedule and the Beach Advisory will remain in place until samples are below WQS or as determined by DEC and the BEACH Project Manager.

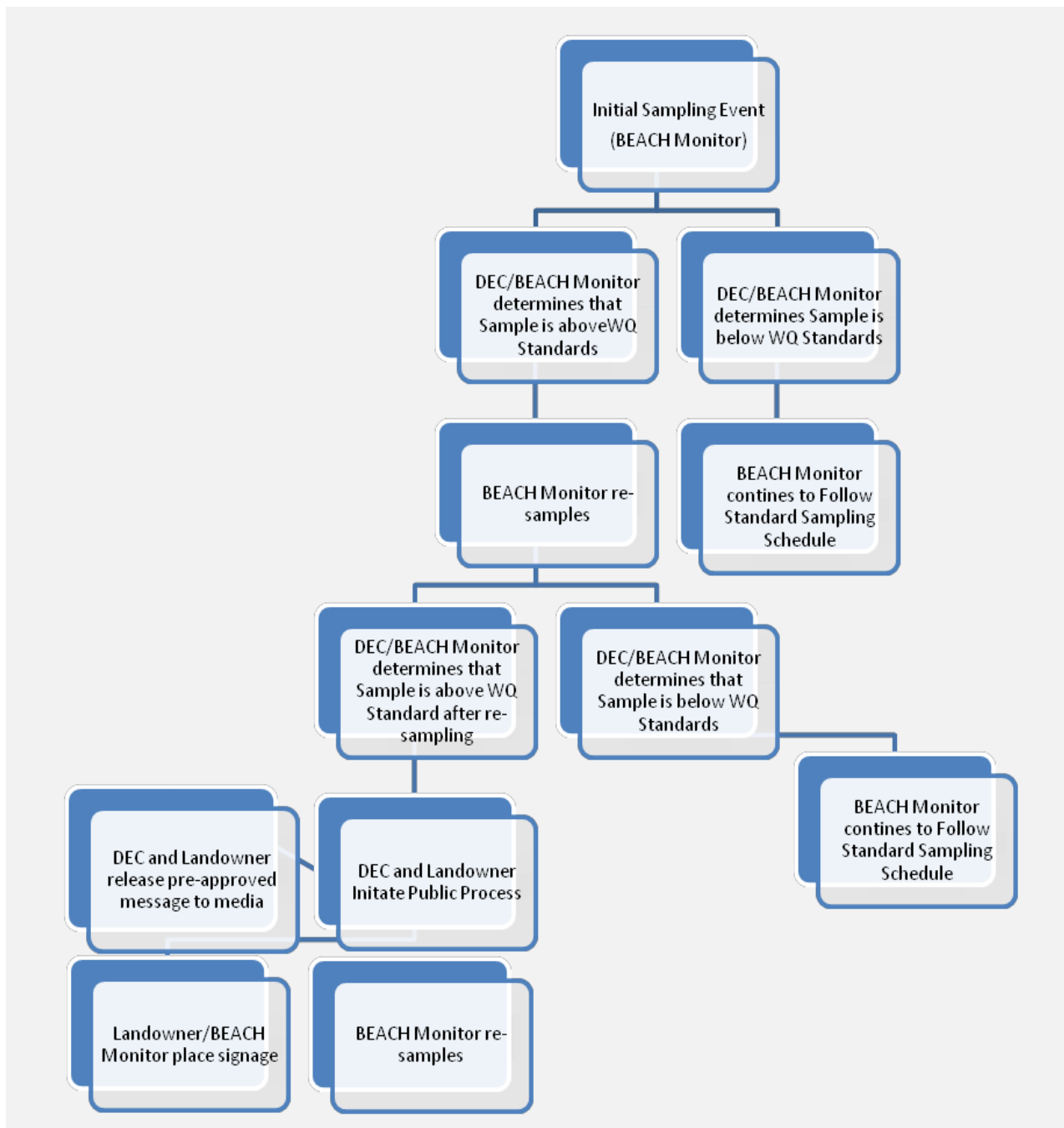


Figure 3: Sample Decision Tree

Section 3 – Notifying the Public

Communicating with the public regarding the nature of the BEACH program, sampling results, and potential responses to Water Quality Standards exceedances is very important. The DEC will work with the respective landowner to distribute public information about sampling results that may require actions such as a Beach Advisory or Beach Closure. Communication plans and specific actions taken will be developed between the DEC, landowner (s), and the BEACH Monitor on a case-by-case basis.

Beach Advisory

DEC will post monitoring results on our web page (beaches.alaska.gov) after each sampling event. DEC will send a beach advisory when beach sampling results indicate potential fecal bacteria contamination above WQC. This advisory will be based on the bacterial counts and the information from the Beach Survey Field Form. Posting may consist of press releases, social media posts, listserv notices, or website updates.

A beach advisory provides recommendations to the public to avoid contact with water that has exceeded the WQS referenced in Section 1 (Table 1) of this handbook. A beach advisory may be issued by DEC upon receipt of water quality sampling results that demonstrate a continued exceedance of water quality standards for bacteria. Proposed advisories require consultation with the DEC Public Information Officer and the DEC BEACH Program Manager.

In 2020 and 2021 DEC utilized the Alaska BEACH Program Listserv and social media to distribute advisory notices to key stakeholders and the members of the public. Anyone can sign up to receive notifications by visiting the Alaska Beach Program webpage and clicking on the listserv link. DEC will continue to utilize social media in 2022 and beyond. See the current communication plan for the project for information on who will post advisories. If the advisory is posted by DEC, all social media posts must receive approval from the DEC Public Information Officer (PIO) before being posted online.

The advisory should include.

- General heading (“ADVISORY” or “WARNING”)
- Reason for the advisory
- Time of the advisory
- Duration of the advisory
- Location of the affected beach
- Number to contact local beach manager for further information

Advisories should be issued in the form of press releases, signs at the affected beach, and fact sheets (informative flyers). Unless stated otherwise in the project communication plan, the DEC will act as the lead in developing advisory information and signage. The press releases should be distributed to local media outlets, government offices, and emergency response entities, and advisory signs should be posted at the beach until additional assessments (sampling) indicate the water quality is acceptable.

Contacts for public notification should be developed and verified at the beginning of each season. Table 2 is a framework for organizing possible contacts.

These media outlets, local governments and emergency response entities can initiate their existing communication protocols to notify the public of potential health risks at the local beach(es). A standard-format press release public service announcement is included in Section 4.

Community Entity	Contact	Phone	Email
Radio Stations			
Newspaper			
City Manager			
Borough Representative			
Police Department			
Fire Department			

Table 2: Contacts for Public Notification during a Beach Advisory

Beach Signs

If a re-sampling event has been triggered and water quality standards continue to show exceedances, a sign should be posted at major beach access points to alert beach users of their risk of illness from water contact recreation. A sign should also be posted on the beach near the location where the fecal contamination was detected so recreational users know it is not safe to swim there. This advisory should recommend that the public avoid water contact activities at the beach until further analyses reveal safe conditions. Signs will be in place until re-sampling determines that water quality standards are being met. An example of a Beach advisory sign is in Section 4.

Fact Sheets or Flyers

Distributing informative flyers in public areas can also communicate potential health risks to local beach users. A flyer could be used as an advisory by passing out press release information to people in public places. It also could be used to educate the community about the BEACH Project. The Alaska BEACH Program produced flyers, posters, and fact sheets that can be used to inform the public. These can be found on the DEC [Alaska BEACH Grant Program Website](#) under the respective sub-page for each beach. These may be modified for specific communities by working with the DEC Project Manager.

Press Release

A press release is likely the fastest way to spread the news about water quality at recreational use beaches in Alaskan communities. The DEC and landowner will act as the lead agents in providing public information. DEC staff will work with the DEC Public Information officer on all press releases sent by DEC.

Section 4: Protocols and Example Forms

Water Sampling Collection Protocols

Water Sample Collection

Water sampling involves wading into the water adjacent to a beach commonly used for water recreation to collect water from below the surface into sample jars. The sample should be collected in the general recreational beach area, or near locations expected to be influenced by fecal contamination (e.g., adjacent to sewage lagoons, near small boat harbors). The (Community Name) BEACH Monitor will complete sampling after the following steps have been accomplished.

- Each sample jar is filled with water
- Each sample jar is labeled
- Each sample jar is placed in a cooler kept chilled with artificial ice (artificial ice reduces potential for cross contamination)
- The Beach Survey Field Form is filled out
- A chain-of-custody form is filled out
- The cooler is transported to the laboratory responsible for determining fecal coliform and enterococcus populations
- A copy of the Beach Survey Field Form and chain-of-custody form is sent to the DEC BEACH Project Manager

Detailed directions for water sample collection, sample handling and delivery are given in the following subsections

Sample Collection Method

A good water sample is collected by avoiding cross-contamination, which can happen when the sampler inadvertently contaminates the sample. To reduce the potential for cross-contamination the sampler must follow a standard sample-collection method. Step-by-step sample-collection instructions are provided below.

1. Request a sample kit from the laboratory. The kit should include.
 - A cooler
 - The appropriate sample bottles for marine water-quality sampling (enterococci and fecal coliform bacteria)
 - Artificial ice to keep the cooler chilled to the appropriate temperature (<10°C)
 - Temperature blank

- Chain-of custody form
 - Custody seal to apply to cooler prior to shipping
 - Sample jar labels
 - An extra set of sample bottles
 - An extra set of sample bottles for a replicate sample
 - Shipping labels
 - Packing material
2. Call the laboratory prior to sampling to make sure there will be someone at the laboratory to receive and process the samples within 6 hours of sampling.
 3. Before collecting samples, consult flight schedules to make sure there will be a flight that can get the samples to the laboratory within 6 hours of sampling.
 4. Write the beach sampling location on the bottle label and Beach Survey Field Form.
 5. Put on clean waders and gloves. Wade into the water to a depth of approximately 3 feet. Try to avoid kicking up sediment or wait until any sediment that has been kicked up settles. Stand downstream of the water current and wait for sediment to clear.
 6. Remove the bottle cap just before collecting the sample. Protect the cap from contamination. Do not touch the inside of the bottle, or the inside of the cap.
 7. Open the sampling bottle and hold onto the base with one hand. Plunge the top of the bottle downward into the water. Avoid introducing surface scum. Point the mouth of the bottle into the current. Hold the bottle about one (1) foot below the water surface and tip it slightly upward to allow air to exit and the bottle to fill.
 8. Remove the bottle from the water. Pour out a little water to leave airspace at the top of the jar.
 9. Tightly close each bottle.

Collect one replicate for each analyte per sampling event. To collect a replicate sample, you must first have requested extra bottles from the laboratory. Repeat Steps 2 through 9 at the same location to complete collection of field replicates.

10. Complete bottle labels and attach them to each sample jar. Labels should be clean, waterproof, non- smearing, and large enough for all the information. Information on the label should include.
 - Sample location (e.g., beach name, KB-Rotary)
 - Sampling date and time

- Laboratory method for analysis
- Name of sampler

11. When finished sampling, wash your hands and arms with soap and water or waterless antimicrobial cleanser, or disinfectant lotion to reduce exposure to potentially harmful bacteria or microorganisms.

Additional Environmental Parameters

Environmental parameters will be collected with DEC provided equipment. A handheld probe (HANNA Instruments combo tester HI98129, or similar) will be used to collect pH, conductivity, total dissolved solids, and water temperature. A turbidimeter (HACH 2100Q Portable Turbidimeter, or similar) will be used to measure turbidity. These environmental parameters will be used in developing a predictive model based on the EPA Virtual Beach Model (<https://www.epa.gov/ceam/virtual-beach-vb>). Calibrate the handheld probe before heading to the field (see calibration instructions in the Appendices). The turbidimeter will need to be checked for proper calibration in the field using a set of provided standards. Always make sure devices are fully charged and/or bring additional batteries. Wave height will be measured using a yard stick or similar measuring device.

1. Handheld Probe

- If water sample collection increased suspended sediment, wait until water settles or move 1-2 steps to the side to take measurements. Stand downstream of the location where you will take the measurements.
- Turn on device. Submerge measurement probe end of the handheld probe in water (do not submerge entire device), and swirl gently to remove air bubbles
- Hold probe until reading has stabilized (indicated by a stability tag on the HANNA model)
- Record measurement value, type, and time of collection on data sheet
- Repeat process for remaining parameters. HANNA device measurements include pH, conductivity, total dissolved solids, and water temperature.

2. Turbidimeter

- Check calibration of device by checking on the provided standards. If devices reading differs from standard, go through the device calibration steps (see Appendices).
- Use a provided vial and fill vial up to rim using methods outlined in the Water Sample section above.
- Wipe outside of vial with provided cloth and a drop of silicone (also provided). Ensure no moisture remains on the outside of the vial, as this may impact the instrument reading.
- Place vial in turbidimeter, ensure that arrow on vial lines up with arrow on device.

- Close lid and run the turbidimeter. Wait until reading stabilizes. Record results on lab data sheet.

3. Wave Height

- Orient the wave stick vertically at sample location. End of stick should be resting on the bottom sediment, but make sure not to allow stick to sink below sediment surface.
- When wave stick is vertical (have a partner step back and confirm that stick is vertical), watch to see where the incoming waves crest on the stick (watch for ~30 seconds). Record the height at which the waves crested.
- Note that wave height will only be collected at wadeable sites.
- Rinse wave stick with fresh water before long term storage

When finished sampling, wash your hands and arms with soap and water or waterless antimicrobial cleanser, or disinfectant lotion to reduce exposure to potentially harmful bacteria or microorganisms. Rinse probe and turbidimeter with deionized water before storing. Use HANNA HI70300 Storage solution for pH probe.

Sample Handling

Sample handling involves packing the samples in a cooler and shipping them to the laboratory. After sample collection is complete the samples must be handled with care so that they arrive to the laboratory in good condition. Step-by-step sample handling instructions are provided below.

1. Place the sample(s) in a pre-chilled cooler containing artificial ice to maintain a temperature from 1° to 10°C. Ask the laboratory ahead of time how many ice packs will be needed. The lab typically provides the ice packs but the BEACH monitor will need to make sure they are frozen solid prior to sampling. Do not allow the samples to freeze. Samples must remain below 10°C until receipt by qualified staff at the laboratory. If samples are too warm the results may be flagged.
2. Place enough packing material inside the cooler to protect the sample bottles from breaking during transport to the laboratory.
3. Complete the chain-of-custody form. Put the form in a plastic bag and tape it to the inside of the cooler lid.
 - Write a note in the “Special Instructions” box requesting that the laboratory results be sent without delay (within 36 hours of sampling) to three people: **(Community Name)** BEACH Monitor, DEC BEACH Project Manager, and DEC BEACH Quality Assurance Officer.
4. If the cooler will be out of your immediate control (such as on an airplane or courier), fill out two custody seals and attach one to the front and one to the back of the cooler to span the lid seam. You want them to tear when the cooler is opened.

5. Securely tape the cooler shut prior to shipment. Attach shipping labels that identify the shipping destination and say: “keep cool,” “do not freeze,” and “fragile.”
6. Ship the samples to (Laboratory Name and Phone Number). Remember that samples must be collected, shipped, and received by the laboratory in 6 hours. Consult flight schedules and call the laboratory prior to sampling to make sure there will be a flight that can get the samples to the laboratory within 6 hours of sampling, and that there will be someone at the laboratory to receive the samples and begin the analyses.

Example Forms

Example Beach Sampling Field Form

Name of Beach _____ Date _____

Nearest Town _____

Describe Sampling Location (Note location on map and attach) _____

Latitude N _____ Longitude _____

SAMPLES

Sample(s) ID: _____ **Time:** _____

Replicate ID: _____ **Time:** _____

Field Blank ID: _____ **Time:** _____

Weather Conditions:

Sunny & Clear _____ Rain _____

Cloudy / Overcast _____ Fog _____

☐ Other (describe): _____

Water Temperature: _____ ☐ °C

Air Temperature: _____ ☐ °F ☐ °C

Wind Speed (approx): _____ Mph

Wind Direction: _____ ☐ On Shore ☐ Off Shore

Precipitation in the last 24 hours: _____ in

Tidal Conditions:

☐ Low Tide ☐ Ebbing

☐ High Tide ☐ Flooding

Tide **Height** **Time**

Low: _____ ☐ ft ☐ m (am/pm)

High: _____ ☐ ft ☐ m (am/pm)

Condition of the beach:

	Debris (Describe)	Vegetation (% Coverage)
On shore		
In water		

Activity on the Beach

Adults _____ Dogs _____

Children _____

Other _____

(describe): _____

Type of Activity

Swimmers _____ Walkers _____ Fishermen _____ Boaters _____

Other _____

(describe): _____

Condition of the Water

☐ Clear ☐ Cloudy & Murky ☐ Oily Film

☐ Other _____

(describe): _____

Potential Sources of Pollution

☐ Water Fowl (approx #): _____ ☐ Boats (approx #): _____

☐ Other _____

(describe): _____

☐ Sanitary Facilities (describe): _____

☐ Sewage odor/presence (describe): _____

☐ Presence of stormwater pipes or other flow across the beach (describe): _____

Additional comments, noteworthy unusual conditions:

Sampler Name (Printed)

Signature

[illegible]

Example Beach Advisory Sign

CAUTION

Swimming May Cause Illness

**WATER CONTACT AND INGESTION OF BEACH WATER MAY BE A HEALTH RISK
DUE TO HIGH LEVELS OF BACTERIA**

*Swallowing contaminated water may cause nausea, vomiting, diarrhea, and fever,
and contact may lead to ear ache or skin rashes.*

Wash after contact with water and avoid swallowing it or swimming.

Fish should be rinsed in clean water and cooked before eating.

Water quality samples with elevated enterococci bacteria levels were collected at
[Beach Name] on [sampling dates].

The water quality will continue to be monitored.

For more information about the results of sampling, please contact:

(FIRST and LAST NAME) at (PHONE NUMBER) or (EMAIL ADDRESS)

Example DEC Press Release

For Immediate Release: [Date]

Contact: [Name, Title, Phone, email]

Elevated Levels of [Enterococci] Bacteria Found at [Beach Name]

(Community Name), Alaska – (Month, Day, Year) – Recent water quality samples collected at [Beach Name] indicate elevated levels of [Enterococci] bacteria in the water. The Alaska Department of Environmental Conservation (DEC) is collecting the samples this summer to determine if the water is safe for recreation.

Contact with water that has high levels of [Enterococci] may cause people to have stomach aches, diarrhea, or ear, eye, and skin infections.

DEC suggests that beach users take normal precautions to avoid exposure, such as avoiding drinking or swimming in the water; washing after contact with the water, and rinsing fish harvested from the area with clean water. As always, people should cook seafood to a minimum of 145 degrees Fahrenheit internal temperature to destroy pathogens.

[Beach Name] is located at the [location description]. Water quality samples were collected [Date(s)]. DEC continues to monitor water quality. If bacteria levels increase significantly, the [landowner] may post advisory signs at the beach until additional sampling indicates that bacteria numbers have dropped to safe levels.

[Enterococci] bacteria can come from any warm-blooded animal including birds, seals, and humans. [The reason for the currently elevated levels is unknown. List any information know about potential sources, e.g., monitoring from nearby wastewater treatment plants.]

The beach sampling program is being funded and implemented by DEC with cooperation of [Grantee and/or Landowner]. It is part of a nationwide effort to decrease the incidence of water-borne illness at public beaches under the federal BEACH Act.

For more information about the Alaska beach monitoring program contact the Alaska [BEACH Project Manager] (phone number) or visit the Alaska BEACH Grant Program Website

(<http://dec.alaska.gov/water/wqsar/wqs/beachprogram.html>)

Example Listserv Email

Good afternoon,

Advisories in affect for Beach Name – bacteria levels above state standards

The results for water samples collected on **Date**, as part of the Ketchikan Beach program are now available. This week's monitoring results are summarized below:

1 enterococci exceedance (130 MPN/100ml, primary contact recreation)

A .pdf of lab results is attached. Visit the [Ketchikan Beach Program](#) page for a beach map, results table, FAQs, and press releases.

The next Sampling event is planned for **Date**. Sample results are expected to be available on **Date**.

The Beach Program is a statewide program which tests bacteria levels in marine water samples from May to September. The program evaluates potential health risks as indicated by fecal coliform and enterococci bacteria and notifies the public when levels exceed state standards. Past years of bacteria monitoring have shown elevated levels of bacteria along the Ketchikan and Kenai coastlines from several potential sources, including seagulls and other wildlife, humans, and dogs.

Visit beaches.alaska.gov for:

- up-to-date information on beach monitoring, which beaches have elevated bacteria levels, and sample collection dates
- advisories for beaches where test results show bacteria levels exceed guidelines
- interactive maps showing beach monitoring locations
- a link where you can sign up to receive emailed beach updates
- historical beach testing data

If advisories are issued for beaches where test results show bacteria levels exceed guidelines, they will also be posted on DEC's [Facebook](#) and [Twitter](#) pages.

There are many ways we can all help keep Alaska's beaches clean and Alaskans healthy. Check out the [DEC beach website](#) for what you can do to help.